

CLAIMS

What is claimed is:

1. A frame for a message in a real-time network protocol for controlling the routing of information on a data communications network, comprising:
 - 5 a preamble field having a single-byte pattern;
 - a single-byte control field;
 - a data count field having from one to three bytes;
 - a destination address field having from one to four bytes;
 - a source address field having from one to four bytes;
 - 10 a data field having from zero to 254 bytes; and
 - a 16-bit checksum field.
2. A real-time network protocol for controlling the routing of information on a data communications network among a plurality of peer network devices comprising a token passing
15 structure for granting message transmission rights on the network having a one-byte control field in each message from one of said devices wherein said control field includes a single grant bit for determining whether the right to control access to the network is to be maintained by the said device generating the message or passed to the next sequential device of said plurality of devices.

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3. The protocol of claim 2 wherein said one-byte control field includes a response required bit for indicating whether or not a response is required from one of said plurality of devices to the message from said message generating device.

5 4. The protocol of claim 3 wherein said one-byte control field includes a response bit for indicating whether or not the message containing the bit is a response to a request from another device.

10 5. The protocol of claim 4 wherein said one-byte control field includes a pair of address mode bits for indicating the number of source and destination address bytes used in the message.

15 6. The protocol of claim 5 wherein the value of said pair of address mode bits indicates one of the following conditions: the message contains a one-byte source and destination address; the message contains a two-byte source and destination address; the message contains a three-byte source and destination address; the message contains a four-byte source and destination address.

7. A method of communicating between a plurality of peer network devices in a queue on a data communications network, one of said devices being a master device, and each of the devices having the ability to pass a token for granting message transmission rights on the network, the method comprising the steps of:

- 5 a. generating a message within one of the plurality of peer network devices,
 the message including a single-byte control field, the single-byte
 control field including a grant bit that determines whether the
 said peer network device intends to pass the transmission rights
 token to the subsequent sequential peer network device on the
10 queue;
- b. sending the generated message to the data communications network;
- c. the subsequent sequential peer network device determining from the
 message control field grant bit whether the token is to be passed
 to it;
- 15 d. passing the token according to the message control field grant bit;
- e. the intended message destination device receiving and complying with
 the generated message;
- f. repeating steps “a” through “e” above for each sequential peer network
 device until token is passed to the last device in the queue;
- 20 g. the master device passing the token from the last device to the first
 device in the queue;
- h. continuously repeating steps “a” through “g.”

8. The method of claim 7 including the additional steps of:

i. the master device identifying any non-responsive peer network device in the queue; and

j. the master device generating a message and passing the token for said non-responsive device each time through the queue.

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9. The method of claim 8 including the additional steps of:

k. the master device occasionally checking any non-responsive peer network devices for a response; and

l. the master device returning each such responsive device to the queue.

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10. The method of claim 9 including the additional steps of:

m. the master device occasionally checking beyond the end of the queue for additional new devices; and

n. the master device adding each such additional device to the queue.

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11. The method of claim 10 including the additional steps of:

- o. the master device establishing a plurality of sequential priority devices on the queue;
- p. the master device passing the token from the last priority device to the first priority device on the queue;
- q. the master device occasionally allowing the token to be passed from the last priority device to the next sequential non-priority device in the queue.

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11. The method of claim 10 including the additional steps of: